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(12) **United States Patent**
Wang(10) **Patent No.:** US 9,408,807 B2
(45) **Date of Patent:** Aug. 9, 2016(54) **SEMI-PERMEABLE ENCAPSULATION SYSTEM WITH TAPERED CONDUITS FOR DIABETES REVERSAL**(71) Applicant: **Taylor Gun-Jin Wang**, Los Angeles, CA (US)(72) Inventor: **Taylor Gun-Jin Wang**, Los Angeles, CA (US)

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(52) **U.S. Cl.**

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(58) **Field of Classification Search**

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See application file for complete search history.

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Primary Examiner — Ernst V Arnold

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ABSTRACT

Some embodiments of the present disclosure include an encapsulated islet for treating diabetes. The encapsulated islet may include a semi-permeable capsular membrane having a plurality of layers including an outer immunoprotection layer, a bridging layer, and an inner backbone layer. A continuous fluid-flow manufacturing process may start production of all membrane layers simultaneously, but at different growth rates for different layers. Each layer may have a plurality of pores, wherein the pores increase in size from the immunoprotection layer to the backbone layer, creating the tapered conduits. The semi-permeable capsular membrane may include the following layers, in order from outermost layer to innermost layer: an immunoprotection layer, a bridging layer, and a backbone layer. With proper balancing of membrane thickness and tapered pore size distribution, the encapsulated islets may be configured to offer a improve insulin transport and offer diabetes patients a treatment or functional cure without immunosuppressive drugs.

9 Claims, 5 Drawing Sheets